MEMOIRS OF THE HOURGLASS CRUISES

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BENTHIC MARINE ALGAE[1]

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ABSTRACT

One hundred and fifty-seven species of marine algae (38 Chlorophyta, 29 Phaeophyta, 85 Rhodophyta, 5 Cyanophyta) have been identified from the Hourglass cruises of the Marine Research Laboratory, Florida Board of Conservation. The monthly collections were made on the continental shelf in the Gulf of Mexico between the entrance to Tampa Bay and Fort Myers at depths of 6 to 73 meters over a period of 28 months and included a variety of oceangraphic data which have served as a basis for certain ecological observations, especially temperature relationships. Eighteen of the species appear to be new records for Florida.

INTRODUCTION

As indicated by Humm and Taylor (1961) in their introduction to the Chlorophyta of the upper west coast of Florida, the marine algal flora of the eastern Gulf is not well known. This applies to vertical and horizontal, as well as to seasonal distribution. With the rapid expansion of the seafood

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Effective July 1, 1969, while this paper was in press, agencies of the State of Florida underwent legislative reorganization and the Florida Board of Conservation was renamed the Florida Department of Natural Resources. Similarly, the former Division of Salt Water Fisheries became the Division of Marine Resources. These names should consequently be considered synonymous in this publication.

industry as well as the encroachment of dredge-fill operations of Florida's west coast, it becomes imperative to study this changing region.

The most comprehensive source for the identification of the algae found in the eastern Gulf of Mexico is *Marine Algae of the Eastern Tropical and Subtropical Coasts of the Americas* (W. R. Taylor, 1961), although much pertinent new information has accumulated since its publication. Humm and Taylor (1961) and S. E. Taylor (1965) studied the Chlorophyta and the Phaeophyta, respectively, of the west coast of Florida. Phillips published lists of the marine algae of Crystal Bay (1960a) and of Tampa Bay to Tarpon Springs, Florida (1960b). Phillips and Springer (1960) presented a list of offshore benthic plants of Tampa Bay, and Dawes (1967) published a field manual of the marine algae of Tampa Bay and vicinity. Van Breedveld (1966) reported on a preliminary survey of the shallow water marine algae of central and northwest Florida. Dawes *et al.* (1967) presented a study of the benthic flora of the southwest coast of Florida. However, none of these studies included seasonal data for a distinct region and in none of them were the plants collected from depths greater than 20 meters.

A series of monthly cruises from August 1965 through November 1967 of the R/V *Hernan Cortez* (Marine Research Laboratory, Florida Board of Conservation) permitted such a study off the coast of Tampa Bay and Fort Myers in depths of water ranging from 6 to 73 meters. This sampling program included trynet and dredge collections of marine plants from 11 stations over a period of 28 months. The lists of algae collected at each station and the general list of marine plants presented in this paper will be valuable in establishing and interpreting patterns of benthic algal distribution and seasonality in the eastern Gulf of Mexico. Coupled with the physical data of the cruises, this information contributes to an understanding of the ecology of marine benthic plants of the west coast of Florida.

ACKNOWLEDGMENTS

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METHODS AND MATERIALS

The techniques and equipment employed in the Hourglass cruises are described elsewhere in this series (Vol. I, Part I). However, a brief description of the techniques will be included here for convenience. Dredge (0.3 meters high by 0.9 meters wide at the mouth) and trynet (6.1 meters wide at mouth) collections were made each month at 10 stations off the west coast of Florida for a period of 28 months, starting August 1965 and continuing through November 1967 (Figure 1, Table 1). After each dredge or trynet haul, the algae were collected and preserved in about 10% formaldehyde-seawater. Microscopic examinations of specimens were made for determination of various reproductive structures (unilocular and plurilocular sporangia, carposporangia, and tetrasporangia). Voucher specimens of all collections (approximately 1200) are deposited in the herbaria of the University of South Florida and the Board of Conservation Marine Laboratory.

Even though sampling was based on monthly collections at the same locality, negative dredge or trynet hauls for a certain species may not be indicative of its absence. Poor growth and/or uneven distribution could affect the presence of a species in the sample. Therefore, seasonality as it is expressed in this paper is not necessarily based on positive samples alone.

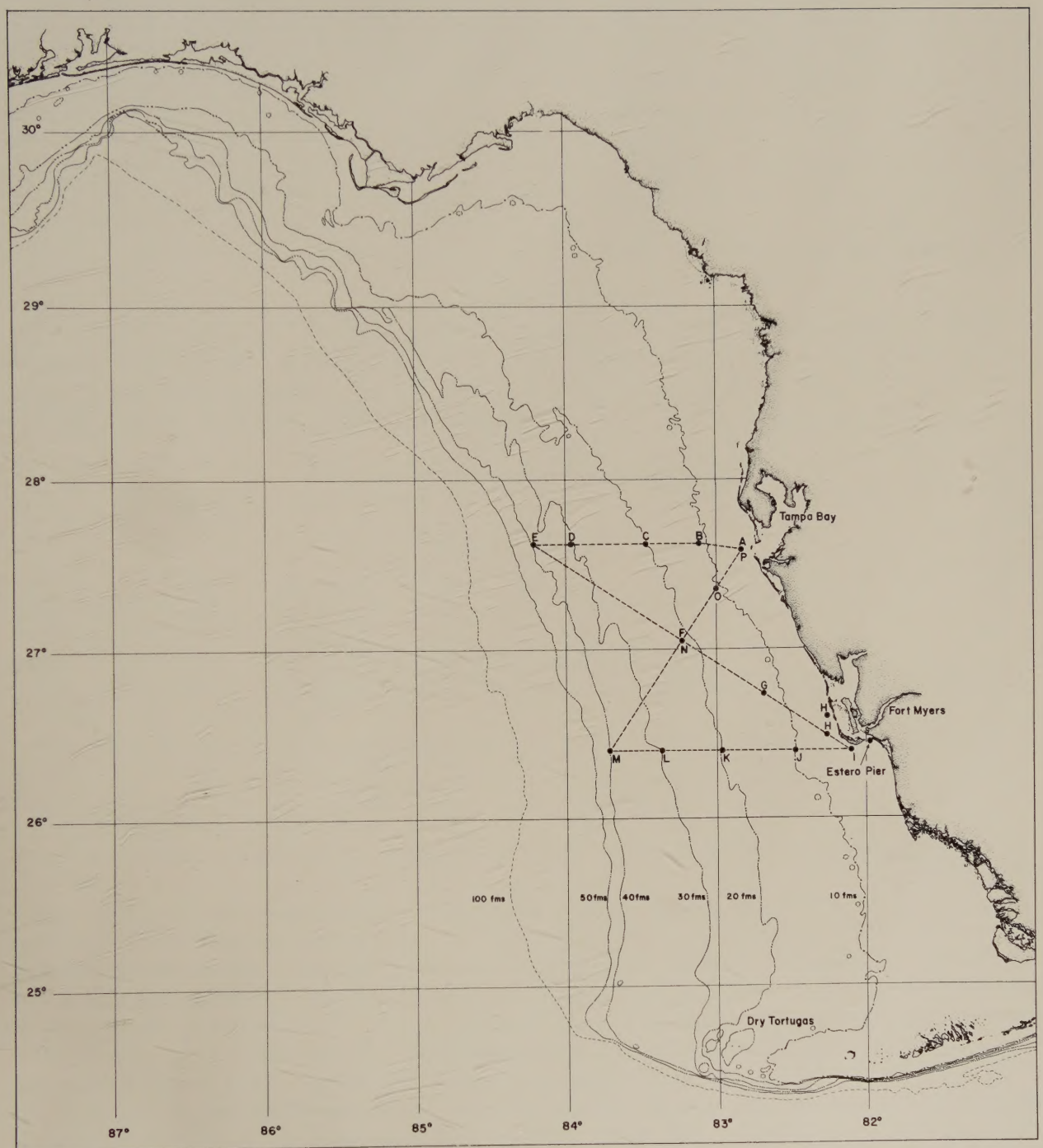

Figure 1. Hourglass cruise pattern and station locations.

TABLE 1. LOCATION OF HOURGLASS STATIONS

Station	Latitude*	Longitude*	Depth ft.	Depth meters	Approximate Nautical Miles Offshore*
A	27°35′N	82°50′W	20	6.1	04-due W of Egmont Key
B	27°37′N	83°07′W	60	18.3	19-due W of Egmont Key
C	27°37′N	83°28′W	120	36.6	38-due W of Egmont Key
D	27°37′N	83°58′W	180	54.9	65-due W of Egmont Key
E	27°37′N	84°13′W	240	73.2	78-due W of Egmont Key
I	26°24′N	82°06′W	20	6.1	04-due W of Sanibel Island Light
J	26°24′N	82°28′W	60	18.3	24-due W of Sanibel Island Light
K	26°24′N	82°58′W	120	36.6	51-due W of Sanibel Island Light
L	26°24′N	83°22′W	180	54.9	73-due W of Sanibel Island Light
M	26°24′N	83°43′W	240	73.2	92-due W of Sanibel Island Light
N	27°03′N	83°14′W	128	39.0	42-due W of Venice

*U. S. Coast & Geodetic Chart 1003 dated June 1966

DESCRIPTION OF AREA

Detailed hydrographic descriptions are given elsewhere in this series (Vol. I, Part I). The predominant substrate is quartz sand with varying percentages of calcareous fragments. Offshore limestone outcroppings are common and these have been the area for previous algal collections by diving (Phillips and Springer, 1960). Table 2 summarizes each station data with regard to bottom

TABLE 2. SUMMARY OF PHYSICAL DATA

Station	A	B	C	D	E	I	J	K	L	M
Temperature (°C)										
High	31.5	30.0	25.8	24.6	26.0	31.0	30.0	26.0	26.0	25.6
	7/67	8/65	8/65	11/65	10/65	8/66	8/65	10/66	11/66	11/65
Low	11.3	13.9	15.8	18.0	17.5	15.5	17.5	18.7	18.0	18.5
	2/66	2/66	2/66	2/67	4/66	2/66	3/66	2/66	1/67	3/67
Average	24.0	23.2	21.8	20.7	20.5	20.4	23.7	22.2	21.5	21.0
Salinity (°/oo)										
High	36.2	36.3	36.5	36.6	36.5	36.4	36.3	36.4	36.6	36.6
	7/67	6/67	9/67	8/67	9/67	8/67	8/67	9/67	7/67	8/67
Low	29.8	31.2	32.2	32.5	32.6	31.5	32.8	33.6	33.9	33.9
	2/66	3/66	3/66	4/66	3/66	2/66	1/66	2/66	2/66	2/66
Average	32.8	35.4	35.9	34.6	36.0	34.8	35.5	35.9	35.8	36.1
Light (depth of Secchi disk in meters)	6	15	30	34	30	4	16	20	16	33
	5/66	10/66	8/66	4/67	7/66	10/66	9/67	8/67	1/67	8/67

temperature and salinity and water transparency. Since Secchi disk readings vary during the day, maximum transparency attained at each station during the 28 months of sampling was considered best in expressing the water transparency at each station.

RESULTS

Interpretation of the physical data is given in Volume I, Part I. From Table 2 it is apparent that an increase in bottom temperatures, salinity stability, and water transparency occurs as the deep-water offshore Stations E and M are approached. Furthermore, the range in fluctuation of bottom temperatures and salinity decreases sharply in the deeper water stations.

A total of 157 species of marine algae including 38 species of Chlorophyta, 29 species of Phaeophyta, 85 species of Rhodophyta and 5 species of Cyanophyta have been identified from the Hourglass collections. Three species of seagrasses are also included. Eighteen of the algal species are

new records for the State of Florida. Nine of these also represent northern range extensions. Four of the 18 new records are still unidentified and may represent new species. Individual stations and species lists are presented in Tables 3 through 13 in the appendix and summarize by month the collections of algae at each station.

The following species list includes critical comments on each species, especially with reference to seasonal data. The numbers following each species refer to previous Florida records (*1* – Dawes, 1967; *2* – Dawes *et al.*, 1967; *3* – Humm and Taylor, 1961; *4* – Phillips, 1960a; *5* – Phillips, 1960b; *6* – Phillips and Springer, 1960; *7* – S. E. Taylor, 1965; *8* – W. R. Taylor, 1961; *9* – Van Breedveld, 1966). An asterisk (*) preceding the species name indicates a new record for Florida.

MARINE ANGIOSPERMS

Because seagrasses are able to grow fastened in sand and other loose sediments, their leaves often provide suitable substrate for algae in regions which would otherwise support only a limited flora (Dawes, 1967.) Seagrass further serves to stabilize bottom sediments and thereby influence water clarity. Of the three genera of seagrasses obtained in the present study, only *Halophila baillonis* was common.

Halophila baillonis Ascherson. Generally common throughout the years at all stations except A. Found in flower (pistillate and staminate) and fruit in late summer and fall.

Syringodium filiforme Kützing. Found only in a single collection from Station I and this appeared to be drift leaves. Apparently restricted to shallow waters.

Thalassia testudinum König and Sims. Collected as fragments throughout the year at almost all stations. Apparently does not grow beyond 20 meters although it is present as drift. Leaves usually heavily epiphytized by a variety of algae (*Lyngbya, Callothrix, Giffordia, Cladosiphon, Acrochaetium, Fosiella).*

MARINE ALGAE

Division Cyanophtya
Order Oscillatoriales
Family OSCILLATORIACEAE

**Lyngbya birgei* G. M. Smith. Collected once at Station B.

**L. confervoides* C. Agardh. Collected at Station B as an epiphyte on *Thalassia* and *Sargassum* in October and November. (5, 6)

L. gracilis (Meneghini) Rabenhorst. Epiphytic on *Thalassia* in one collection from Station J. (5, 6)

Order Nostocales
Family RIVULARIACEAE

Calothrix confervicola (Roth) C. Agardh. Found once on *Thalassia* leaves at Station B in October. (4, 5, 6)

**Dichothrix penicillata* Zanardini ex. Bornet & Flahault. Epiphytic on drift *Sargassum* at the outer stations (D, E) in summer and fall.

Division Chlorophyta
Order Tetrasporales
Family PALMELLACEAE

Pseudotetraspora antillarum Howe. Epiphytic on *Thalassia*. Found only twice at Stations B and C in October. (1, 3)

Order Ulvales
Family ULVACEAE

Enteromorpha clathrata (Roth) J. Agardh. Found once at Station K in May. Cells of the main axis measured 40 μ in length. (1, 3, 5, 8)

E. plumosa, Kützing. Collected once, intermixed with *Polysiphonia subtilissima* At Station K, June. (5, 8)

Order Siphonocladales

Family CLADOPHORACEAE

Cladophora delicatula Montagne. Collected once at Station L in September. Occurring as tufts mixed in with sand and shell. (3, 5, 8)

Cladophora expansa (Mertens) Kützing. Collected once at Station C in March. Main axial cells measured 100 to 140 μ in diameter. The plant appeared angled and flexuous. (9)

**C. howei* Collins. Collected once at Station C in June on a mixture of sand and *Giffordia* sp.

Family VALONIACEAE

Anadyomene stellata (Wulfen) C. Agardh. Collected at Stations B, C and M. Plants erect, stalked forms reaching 15 to 20 cm in height. (1, 3, 5, 8, 9)

Cystodictyon pavonium J. Agardh. A common plant at 40 to 60 meters. Occurring at different stations throughout the year. Most collections were fragments, occasionally entire plants reaching 2 dm in width were recovered. (1, 4) [Pl. II, Figs. 3, 4]

Struvea pulcherrima (J. E. Gray) Murray and Boodle. A deep-water plant (Stations C, D, E, K, L, and M) found most often during summer and fall months. Largest plants (to 25 cm wide in unbroken blades) occurring in late fall. (8) [Pl. II, Fig. 5]

Valonia macrophysa Kützing. A single cluster of vesicles found at Station B in March. Possibly drift material. (6, 8)

Order Siphonales

Family BRYOPSIDACEAE

Bryopsis hypnoides Lamouroux. Collected once at Station C in May. Filaments 100 to 120 μ diameter with little constriction at branchlet-main axis junction. (1, 2, 5, 8)

B. sp. A small fragment consisting of filaments growing on *Laurencia gemmifera* and collected at Station C in July.

Family CAULERPACEAE

Caulerpa ashmeadii Harvey. Collected in late summer at Stations J and K. (1, 2, 3, 5, 8)

C. cupressoides (West) C. Agardh. Collected at Station K in August. The plants appear to be var. *flabellata* Bǿrgeson. (1, 2, 3, 5, 6, 8)

C. mexicana (Sonder) J. Agardh. Found in collections from Stations A, B, C, J, and K. Plants from shallow water stations (A, B, J) more robust and larger with blades reaching 25 cm in length. Plants of deeper water stations (C and K) had blades which were finely divided. (1, 2, 3, 5, 6, 8)

C. microphysa (Weber-van Bosse) J. Feldman. Collected in deeper water stations (C and K). Mostly occurring as fragments or epiphytic on *Dictyota dichotoma.* (2, 8)

C. paspaloides (Bory) Greville. Collected at Station B in May, August and November, apparently restricted to shallow water. (1, 2, 3, 4, 6, 8)

C. peltata Lamouroux. Found occasionally at Stations B and C. (1, 2, 3, 8)

C. prolifera (Forsskål) Lamouroux. A single collection in July from Station B contained some pale-green plants with thin blades, typical of this species. (1, 2, 3, 4, 5, 6, 8, 9)

C. p. f. *zosterifolia* Bǿrgesen. Apparently an ecological variant adapted to low light. Found during summer and fall months in 20 to 60 meters. These plants resembled the previously described species *Caulerpa olivieri* Dostal. However, this species appears to be the ecological form *zosterifolia* based on culture studies by Craig Barilotti (M. A. thesis, Univ. of South Florida, Tampa). (1, 2, 3, 8)

C. racemosa (Forsskål) J. Agardh. Collected only once from Station C in February. (1, 2, 3, 8)

C. sertularioides (Gmelin) Howe. Most commonly occurring species of this genus in the Hourglass collections. Occurring throughout the year at all stations. Morphology varies from blades densely beset with branchlets to laxly branched blades. Generally, in the winter months, the plants have only rhizomous growth, lacking distinct blades. (1, 3, 5, 6, 8)

C. vickersiae Bǿrgesen. A fragment collected from Station C in March. Branchlets 40 to 150 μ diameter with rhizome up to 350 μ in diameter. (8) [Pl. III, Fig. 6]

Family CODIACEAE

Avrainvillea asarifolia Bǿrgesen. Two plants collected in May at Station C. (1, 6, 8)

A. levis Howe. Two collections from Stations B and C. Filament diameter ranged from 10 to 30 μ with only a slight moniliformity. (1, 3, 8)

A. longicaulis (Kützing) Murray and Boodle. Collected at Station B in July and C in October. Filaments constricted to slightly moniliform, 30 μ diameter. (2)

A. nigricans Decaisne. A number of plants obtained from Stations B and C during the summer-fall months. Interior filaments strongly moniliform, diameter 40 to 50 μ. (1, 3, 7, 8)

Boodleopsis pusilla (Collins) Taylor, Joly and Bernatowicz. A single collection at Station D in November appeared as a dense tuft of filaments mixed in the sand. (1, 2)

Codium isthmocladum Vickers. Common at all stations and occurring throughout the year at Stations B and C. Largest and bearing gametangia during the fall months. (1, 2, 3, 6, 8, 9)

C. i. subspec. *clavatum* (Collins and Hervey) Silva. Common throughout the year at Station C and found at all stations except A. (8) (Pl. V, Figs. 10, 11, 12)

C. repens Crouan *in* Vickers. Collected at Station B throughout the year. Utricles 90 to 210 μ diameter, 350 to 910 μ long. (3, 6, 8)

**C.* sp. Collected throughout the summer and fall months in the deeper water stations (C, D, K, and L). The plant requires further study before generic or specific title can be applied. Structure and morphology resemble *Codium.* Dr. P. C. Silva, University of California, has compared it to the southern hemisphere genus *Pseudocodium* (personal communication). [Pl. IV, Figs. 7, 8, 9]

Halimeda discoidea Decaisne. Common throughout the year at Stations B and C and relatively frequent at Stations J, K, and L. Individual segments reach 3 to 4 cm in width. (1, 2, 3, 6, 8)

H. incrassata (Ellis) Lamouroux. Only fragments, collected once at Stations C and K. Apparently a plant of shallow water where it is found growing among seagrasses. (1, 2, 3, 8, 9)

H. opuntia (Linnaeus) Lamouroux. Common at most stations, occurring throughout the year at Stations C and K. The plants spread laterally but do not form dense colonies as commonly found in the Florida Keys. (2, 6, 8)

Udotea conglutinata (Ellis and Solander) Lamouroux. Common throughout the year at Stations B and C, occasionally found at D, J, and K. The plants averaged about 4 cm with a maximum height of 8 cm. (1, 2, 3, 5, 6, 8)

U. cyathiformis Decaisne. Two mature plants collected at Station B in November. (8)

U. flabellum (Ellis and Solander) Lamouroux. Occurring at Station B throughout the year. The blades reached 13 cm in length but were more commonly about 5 to 6 cm and usually heavily epiphytized by *Laurencia.* (1, 2, 3, 6, 8, 9)

Division Phaeophyta

Order Ectocarpales

Family ECTOCARPACEAE

Ectocarpus elachistaeformis Heydrich. Collected once from Station B in October. Epiphytic on *Thalassia.* (1, 4, 5, 7, 8, 9)

Giffordia conifera (Bǿrgesen) Taylor. Exhibits spring growth, taking on "bloom" proportions at Stations C and D, becoming mature by mid-July. Cell diameter 36 μ, length 50 μ. (1, 2, 7)

G. rallsiae (Vickers) Taylor. Epiphytic on a single blade of *Thalassia* in June at Station J. (1, 2, 5, 7)

G. sp. Sterile material collected in spring and early summer at Stations B, C, and D. Material resembles *G. conifera* in cell size and might be immature plants of this species.

Order Sphacelariales

Family SPHACELARIACEAE

Sphacelaria furcigera Kützing. Epiphytic on *Sargassum* in November at Station C. (1, 2, 4, 5, 6, 7, 8)

Order Dictyotales

Family DICTYOTACEAE

Dictyopteris delicatula Lamouroux. Collected at Station B in August and September. Plants small, reaching 5 to 6 cm. (1, 6, 7, 8)

D. justii Lamouroux. Common in collections from 40 meters (Stations C and K). Found to contain unilocular sporangia in the fall months of 1967. (7, 8)

**D. membranacea* (Stackhouse) Batters. A delicate plant reaching 13 cm in height, found at Station B during July and October.

Dictyota dichotoma (Hudson) Lamouroux. Found most of the year but more common in the fall months. Not taken at Stations A and I. Commonly an epiphyte on other algae. (1, 2, 5, 7, 8, 9)

D. divaricata Lamouroux. Common during late summer at Stations B, C, and J. Occasionally the plants formed dense mats. (1, 2, 6, 7, 8)

*Dictyotaceous brown alga. Collected at Station M in two consecutive Septembers. Will require further study before identification is possible. Morphology resembles *Syringoderma.*

Padina pavonica (Linneaus) Thivy *in* Taylor. Collected in July at Station C. (8)

P. sanctae-crucis Børgesen. Collected only in the early fall months at Stations D, L, and M. (2, 7, 8)

Pocockiella variegata (Lamouroux) Papenfuss. Plants varied in morphology from crustose to erect forms, common at Stations C and K during fall collections, also occurred at Stations D, L, and M. (2, 7, 8)

Spathoglossum schroederi (Mertens) Kützing. Specimens primarily fragments. Found at Stations C and M. (1, 7, 8)

Order Chordariales

Family CHORDARIACEAE

Cladosiphon occidentalis Kylin. Apparently a spring-summer plant of Stations B, C, D, and K, becoming very abundant in dredge collections at Stations C and K during June and July. Growth is "late" when compared to shallow water collections of less than 10 meters where the plant is part of the winter-spring flora. (1, 2, 4, 5, 6, 7, 8)

Order Sporochnales

Family SPOROCHNACEAE

Nereia tropica (Taylor) Taylor. Very common in summer and fall months at Stations C, K, and L, usually intermixed with *Sporochnus.* (7, 8)

Sporochnus bolleanus Montagne. Very abundant in dredge hauls during the months of June through August with occasional fragmented older plants during September through January. Common at all depths beyond 10 meters. (1, 7, 8)

S. pedunculatus (Hudson) C. Agardh. Similar in distribution to *S. bolleanus* although much more common. Occurring throughout the year but assuming "bloom" proportions in summer months. Unilocular sporangia present in August and September. (1, 7, 8, 9)

Order Dictyosiphonales

Family PUNCTARIACEAE

**Chnoospora minima* (Hering) Papenfuss. A single plant (with unilocular sporangia) collected in February at Station C and identified by Dr. H. J. Humm. Previously reported from Southern Antilles.

Colpomenia sinuosa (Roth) Derbes and Solier. Common at Stations B, C, D, K, and M during the summer and fall months. Plants sterile throughout the summer, forming some unilocular sporangia in the fall. (1, 2, 7, 8)

Rosenvingea intricata (J. Agardh) Børgesen. Common at Stations B, C, D, J, K, L and M in spring, abundant in summer with unilocular sporangia present from June through August. (1, 2, 4, 5, 7, 8)

R. sanctae-crucis Børgesen. Occasional plants collected at Stations B and C. (2, 4, 7, 8)

Order Fucales

Family CYSTOSEIRACEAE

Sargassum filipendula C. Agardh. Found throughout the year at most stations. New growth (branches) initiated during the late winter and spring, concepticals produced during the summer with mature plants occurring in the fall. Heavily epiphytized during the summer-fall months. (1, 2, 5, 6, 7, 8, 9)

S. f. v. *montagnei* (Bailey) Grunow. Similar to the species in distribution and common throughout most of the year with the same apparent growth habits. (1, 2, 7, 8)

S. fluitans Bøgesen. Common in drift throughout most of the year, especially at outer offshore Stations D, E, L, and M. (1, 2, 7, 8, 9)

S. natans (Linnaeus) J. Meyen. Especially common as drift during summer and fall months at all stations except A and I. (1, 2, 7, 8, 9)

S. vulgare C. Agardh. Specimens conforming to this species found in collections from Stations C and D in May. However, specimens are fragments and consequently, identification is tentative. (2, 6, 8)

S. sp. A number of collections contained only bases of *Sargassum*, presumably *S. filipendula,* but identification remains tentative.

Division Rhodophyta

Order Bangiales

Family BANGIACEAE

Asterocytis ramosa (Thwaites) Gobi. Growing epiphytically on *Udotea* at Station B in February. (8)

Erythrocladia sp. Small fragments found epiphytic on *Udotea* at Station B in February.

Order Nemalionales

Family ACROCHAETIACEAE

**Acrochaetium antillarum* Taylor. Found once as an epiphyte on *Agardhiella tenera* at Station B in November. Previously reported from Tobago.

A. flexuosum Vickers. Collected once at Station B in February, epiphytic on *Udotea.* Plants sterile, cells 7 μ in diameter and 28 μ in length. (4, 5)

**A. thuretti* (Bornet) Collins and Hervey. Common epiphyte on *Thalassia* and *Sargassum* at Station B in November.

Family HELMINTHOCLADIACEAE

Helminthocladia calvadosii (Lamouroux) Setchell. A single, large fragment taken at Station K in May was identified by Dr. H. J. Humm. (8)

Order Gelidiales

Family WURDEMANNIACEAE

Wurdemannia miniata (Draparnaud) Feldmann and Hamel. Small clumps of this species found at Stations B and J. (1, 2, 4, 5, 6, 8)

Order Cryptonemiales

Family CORALLINACEAE

Amphiroa rigida Lamouroux v. *antillana* Bøgesen. Found occasionally at Stations B and C in the fall. (1, 6, 8)

Fosliella atlantica (Foslie) Taylor. common epiphyte on *Thalassia* and *Sargassum* at Stations B, C, D, J, K, L, and M during the summer and fall months. (1, 2)

Goniolithon mamillare (Harvey) Foslie. Collected at Stations C, J, K, L, and M and probably present throughout the year. Sterile in all collections. Identifications in this genus and *Lithothamnium* verified by Dr. H. J. Humm. (8)

G. strictum Foslie. Sterile, occurring throughout the year at Station M. (8)

Jania adherens Lamouroux. Present in collections from Stations B, C, and D. Epiphytic on *Sargassum*. (1, 2, 6, 8)

J. capillacea Harvey. Two collections from Station B in October and August. (1, 5, 6, 8)

Lithothamnium floridanum Foslie. Collected at Station L in September. Material was sterile and consequently identification is tentative. (8)

L. incertum Foslie. Specimens sterile, common at Station B and found occasionally at other stations throughout the year. (8)

L. occidentale (Foslie) Foslie. Probably the most common member of the Melobesieae with the exception of *Fosliella.* Sterile, occurring at most stations throughout the year. Some dredge hauls contained up to 20 liters of this species. (1, 6, 8)

Family GRATELOUPIACEAE

Halymenia agardhii De Toni. Fragments, possibly drift, found primarily during the summer and fall months. (1, 2, 5, 6, 8, 9)

H. bermudensis Collins and Howe. Collected mostly in summer and fall months at Stations B, D, E, L, and M, especially common at Stations E and M. Mostly small (to about 7 cm) orbicular blades. Cystocarpic and tetrasporic in November. Stellate ganglia 17 μ in diameter, thallus 50 to 100 μ thick. (8)

H. floresia (Clemente) C. Agardh. Species fairly common during fall collections at Stations B, C, J, K, L, and M. (1, 2, 6, 8, 9)

H. floridana J. Agardh. Plants common during summer and fall at Stations C, D, E, L, and M. Cystocarps appearing in the fall. (8)

H. gelinaria Collins and Howe. Common during fall and winter months at Stations B and C. Also taken at Station M in February. (1, 6, 8)

H. pseudofloresia Collins and Howe. Large (to 3 dm long) plants collected at Station B and occasionally at other stations, July through October. Cystocarpic in fall. (1, 6, 8, 9)

**H.* sp. Unidentified specimens of *Halymenia* were taken at Stations D, E, and M during the months of July through October. Plants strap-shaped with marginal proliferations reaching 4-5 cm in length. This material requires further study.

Family SQUAMARIACEAE

Peyssonnelia rubra (Greville) J. Agardh. Occasionally found in summer and fall in depths of 20 to 60 meters (Stations B, C, L, and M). (1, 2, 6, 8)

Order Gigartinales

Family GRACILARIACEAE

Gracilaria armata (C. Agardh) J. Agardh. Fragments collected in September and July at Stations B and J respectively. (1, 2, 8, 9)

G. blodgettii Harvey. Plants common at Stations B and K during spring to fall months with occasional young plants collected in May and June. Cystocarpic mostly in summer months, fragments of older material present in November. Medullary cell diameter 900 to 1200 μ. (1, 2, 5, 8)

G. cervicornis (Turner) J. Agardh. Found in July, August, and December. Apparently drift material, possibly originating from Tampa Bay where this species is common. (1, 2, 6, 8)

**G. cuneata* Areschoug. Collected once at Station M in September; cystocarpic. Previously reported from Brazil.

G. cylindrica Børgesen. Most common in fall; occurred at Stations B, C, D, E, J, K, L, and M. Mostly as fragments, occasionally cystocarpic. Medullary cells to about 400 μ, more commonly 200 μ in diameter. (2, 8, 9)

G. damaecornis J. Agardh. A single collection from Station J in August. (1, 5, 8)

G. debilis (Forsskål) Børgesen. Found at Stations B and J throughout the year. Also occurred at Stations C, D, and K. Cystocarpic in August through November. (1, 2, 8)

G. ferox J. Agardh. Common during summer and fall, found at Stations B, C, D, J, and K. Cystocarpic in October and November. (6, 8)

G. foliifera (Forsskål) Børgesen. Present at most stations but more common at Stations B, C, D, J, and K. Occurring throughout the year, cystocarpic during the winter. Plants collected in 60 to 80 meter depths were laciniate with proliferous margins, whereas the fronds collected from 20 to 40 meter depths were subterete, approaching the v. *angustissima.* (1, 4, 5, 8)

G. f. v. *angustissima* (Harvey) Taylor. Occurring throughout the year at most stations. Abundant at Stations B, C, J, and K. Cystocarpic in fall. (1, 8)

G. mammillaris (Montagne) Howe. The predominantly occurring species of the genus at most stations during the year. Cystocarpic in January, October, and November. (1, 6, 8, 9)

G. sjoestedtii Kylin [=*Gracilariopsis sjoestedtii* (Kylin) Dawson]. Collections from Stations B and J, in August and November respectively. (1, 2, 8, 9)

G. verrucosa (Hudson) Papenfuss. Common to Stations B and J. Present throughout the year. Cystocarpic in October, December and March. (1, 2, 4, 5, 6, 8, 9)

Family HYPNEACEAE

Hypnea cervicornis J. Agardh. Single collection at Station J in July, probably fragments in drift from shallower water where it is common. (1, 2, 5, 8, 9)

Family RHODOPHYLLIDACEAE

**Rhodophyllis gracilarioides* Howe and Taylor. A single, entire plant was collected at Station M in July but identification is tentative and further study is required. Previously reported from Brazil.

Family SOLIERACEAE

Agardhiella ramosissima (Harvey) Kylin. Found at Station B throughout the year, also occurring at Stations C, J, and K. Cystocarpic in fall. (1, 2, 5, 8, 9)

A. tenera (J. Agardh) Schmitz. Occurring throughout the year at all stations except E and M. Cystocarpic in the summer-fall months, most common at Stations B, C, and J. (1, 2, 5, 6, 8, 9)

Eucheuma acanthocladum (Harvey) J. Agardh. Collected primarily at Station B but occurring in deeper water as well. Found throughout the year, most abundant in the winter. (1, 2, 6, 8, 9) [Pl. I, Fig. 1]

E. isiforme (C. Agardh) J. Agardh. Plants large (to 4 dm), commonly occurring at most stations throughout the year. Cystocarpic in winter. (1, 2, 5, 6, 8, 9) [Pl. I, Fig. 2]

Order Rhodymeniales

Family CHAMPIACEAE

Champia parvula (C. Agardh) Harvey. A common epiphyte on *Sargassum* and *Laurencia* during the spring, summer, and fall months at Stations B, C, J, and K. (1, 2, 4, 5, 6, 8)

Lomentaria baileyana (Harvey) Farlow. Occasional plants found at Station B during February, March, August, and September. Cystocarpic in March. (1, 2, 5, 8)

Botryocladia occidentalis (Børgesen) Kylin. Common at several stations throughout the year, forming large clumps to 4 dm in height, and heavily epiphytized. (1, 2, 6, 8)

Chrysymenia enteromorpha Harvey. Apparently exhibits growth during spring and summer, becoming cystocarpic in July through October. Present at most stations. (1, 6, 8)

C. halymenioides Harvey. Single collection from Station M in July contained one large fragment. (8)

C. ventricosa (Lamouroux) J. Agardh. Collected once at Station B in November and twice at Station C (cystocarpic) in June and October. (1)

**Fauchea hassleri* Howe and Taylor. Three separate collections from Stations L (September), M (September), and C (August) contained this species. Previously reported from Brazil.

**F. peltata* Taylor. Single collections from Station M in September contained 10 cystocarpic specimens of this rarely found species. The cystocarps, previously unknown will be described later. Reported from Jamaica.

**F.* sp. Summer collections, three from Station C and one from Station L. These specimens were similar to *F. hassleri* in anatomy but with a heavily branched thallus consisting of short dichotomies.

**Leptofauchea brasiliensis* Joly. A single collection from Station M in September contained a number of specimens. Previously reported from Brazil.

**L. rhodymenioides* Taylor. Two collections from Station C in November and January and one from Station D in February. Cortical cells measured up to 14 μ in diameter, unbranched. Medullary cells in 1 to 2 rows, diameter of 280 to 350 μ. Previously reported from the Netherlands Antilles.

Order Ceramiales

Family CERAMIACEAE

Callithamnion halliae Collins. Collected from Stations B and C as epiphytes on fragments of *Thalassia, Sargassum,* and *Polysiphonia.* Occurring during spring to fall months. (1, 8)

Ceramium fastigiatum (Roth) Harvey. Collected September through November at Station B as an epiphyte on various algae and *Thalassia.* (1, 2, 6, 8, 9)

C. leptozonum Howe. A single collection from Station B in September. Epiphytic on *Thalassia.* (1)

C. rubrum (Hudson) C. Agardh. Epiphytic on *Gracilaria debilis* from Station B in March. (5, 8)

Crouania attenuata (Bonnemaison) J. Agardh. Apparently perennial, found at Stations B and J, occurring as an epiphyte on various algae (*Amphiroa, Spyridia*). (1, 6, 8)

**Griffithsia barbata* (Smith) C. Agardh. A single collection from Station K in May. Cell diameter 27 to 150 μ, about 8 X the diameter in length. Previously reported from the Virgin Islands.

Spyridia filamentosa (Wulfen) Harvey. A common perennial at inshore stations (B and J) and occasionally at Stations C, D, E, and K. (1, 2, 4, 5, 6, 8, 9)

Family DASYACEAE

Dasya collinsiana Howe. A single collection from Station B in November contained one small fragment (5 cm in length). (8)

D. corymbifera J. Agardh. Found in collections made from February through October, tetrasporic material occurring in February. Apparently restricted to inshore stations (B, I, K). (1, 8)

D. crouaniana J. Agardh. Fragment collected at Station M in September. (8)

D. harveyi Ashmead. Collections from Stations C and D (July) and K (June) contained large (to 10 cm in length) specimens. (8)

D. pedicellata (C. Agardh) C. Agardh. Most common species of the genus, young small plants common in May or June. Fruiting material (cystocarpic, tetrasporic, spermatangial) occurring in February, March, May, June, and July. Found at all but the shallowest depths; most common at Stations B, C, D, and K. (1, 2, 4, 8)

D. rigidula (Kützing) Ardissone. Found in late summer and fall at stations of medium depths (B, C, J, and K. (8)

Family DELESSERIACEAE

Hypoglossum tenuifolium (Harvey) J. Agardh. An entire plant was obtained from a dredge haul at Station M in September. (1, 2, 6, 8)

Family RHODOMELACEAE

Brongniartella mucronata (Harvey) Schmitz. Collected from Station B in September and October, Station C in December, and Station J in June. (8)

Chondria atropurpurea Harvey. A single fragment found at Station J in June, and the identification must be considered tentative. (8)

C. baileyana (Montagne) Harvey. Fragment taken from dredge haul at Station K in June appears to belong to this species but identification is open to question. (8)

C. floridana (Collins) Howe. A number of mature plants collected from Station B and K during summer and fall. (8, 9)

C. sedifolia Harvey. Tetrasporic plants obtained from Station J in July. (1, 2, 5, 8)

C. tennuissima (Goodenough and Woodward) C. Agardh. Fragments apparently belonging to this species found in dredge collections at Stations B and J in May and August respectively. (1, 2, 5, 8)

Digenia simplex (Wulfen) C. Agardh. Found in trynet collections from Stations B and L in August and July. The material may have drifted from shallower waters where this species is known to occur. (1, 4, 5, 6, 8, 9)

Laurencia gemmifera Harvey. Most common species of the genus, occurring at all stations generally throughout the year. Morphology varied from densely branched in shallow water to very elongate, little branched in deep water. The mammillate nature of the cortical cells was not always apparent and possibly some material has been identified as *L. poitei.* (5, 8)

L. intricata Lamouroux. Only found in trynet collections from Stations B, J, and K during August and May. Probably drift from inshore where it occurs regularly. (1, 2, 4, 5, 6, 8, 9)

L. obtusa (Hudson) Lamouroux. Collected at Stations B, C, D, and K during September. (1, 2, 5, 6, 8, 9)

L. poitei (Lamouroux) Howe. Found almost throughout the year at Stations B, C, D, and J; also taken at A, I, K, and M. (1, 2, 4, 6, 8, 9)

Lophosiphonia cristata Falkenberg. A single collection of epiphytic material on *Thalassia* from Station C in October, probably drift material. (1)

Polysiphonia denudata (Dillwyn) Kützing. Present in collections from Stations C and D in June and May. (1, 5, 6)

P. hapalacantha Harvey. A single collection from Station B in August contained fragments. Apparently drift material from Tampa Bay where it is common. (1, 6, 8)

P. subtilissima Montagne. Collected at Stations B (September and April), C (May), J (May), and K (May and June). Cystocarps present in April specimens. (1, 2, 5, 8, 9)

Wrightiella blodgettii (Harvey) Schmitz. Spring-summer occurrence with pericarps found in April and July. Present at Stations B, C, D, K, and M. (8)

W. tumanowiczi (Gatty) Schmitz. Found at Stations C (May and June), D (May), and K (September). (8)

DISCUSSION

The remarkable variety of algae found in these collections supports emphatically the opinions of others (Humm and Taylor, 1961; S. E. Taylor 1965; Dawes *et al.*, 1967) that there is a rich benthic algal flora of perennial and annual, subtropical and tropical species on the inner continental shelf along the Florida Gulf coast.

Of the 157 species recorded, 18 are new records for Florida and four additional species are yet to be determined.

The most striking seasonal aspect of algal collections of the Hourglass cruises is the large number of perennial plants encountered in depths of 20 to 60 meters. In general, the flora of this region appeared to be stable, showing little change in character throughout the year. Such information agrees well with the apparently stable temperature, salinity and light penetration at the deeper stations. In contrast to this, shallow water Stations A and I indicated a poor flora with pronounced seasonality. This is possibly because of the scarcity of a suitable substrate coupled with the wide range in temperatures during the year. A similar paucity of species occurs at the 80 meter depths although the flora is perennial. The limited number of species at these stations (E and M) may be explained by poor light penetration.

Seasonal fluctuation was most evident in members of the Phaeophyta *(Cladosiphon, Colpomenia, Dictyota, Giffordia, Rosenvingea,* and *Sporochnus)* which showed a general late-spring to summer growth period, maturing during late summer and early fall and disappearing during early winter.

A second general feature of these collections is the predominance of tropical genera and species. The benthic flora in the 20 to 80 meter depths contained such tropical genera as *Avrainvillea, Caulerpa, Cystodictyon, Halimeda,* and *Struvea* (Chlorophyta); *Dictyopteris, Sargassum* and *Sporochnus* (Phaeophyta); and *Botryocladia, Eucheuma, Gracilaria, Halymenia, Laurencia,* and *Wrightiella* (Rhodophyta).

Finally, the occurrence of economically important plants should be mentioned. Such species of *Eucheuma* as *E. acanthocladum* and *E. isiforme* were found as common inhabitants of the 20 to 60 meter depths. These plants were perennials and in some collections the species reached a height in excess of 0.5 meters.

Studies on the unidentified material noted in the species list and on the cystocarpic plants of *Fauchea peltata* are in progress and future papers will discuss their taxonomy, anatomy, and morphology. Further offshore studies and SCUBA collections are in preparation and should yield additional quantitative information on offshore benthic marine algae of the continental shelf of Florida's Gulf coast.

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APPENDIX

This appendix consists of Tables 3 through 13 corresponding to the individual stations of the Hourglass cruises. Each table is a summary, by month, of the benthic algal collections for a given station. The following symbols are used in the tables: X = plants present in collections; CPS = cystosporic or cystocarpic plants; ⊕ = tetrasporic plants; F = fruiting plants (unilocular or plurilocular sporangia, gametangia); FL = flowering.

TABLE 3. HOURGLASS ALGAL COLLECTIONS – STATION A

Lat. 27°35′N, Long. 82°50′W: Depth 20′ (6.1 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CHLOROPHYTA																												
Caulerpa mexicana								X																				
C. sertularioides					X			X																				
Codium isthmocladum							X	X																				
PHAEOPHYTA																												
Sargassum filipendula										X																		
S. f. v. *montagnei*						X		X																X				
S. natans			X																									
S. sp.							X																					
Sporochnus pedunculatus																								X			X	
RHODOPHYTA																												
Agardhiella tenera						X																						
Botryocladia occidentalis							X	X																				
Eucheuma acanthocladum												X																
E. isiforme										X													X					
Gracilaria foliifera					X																							
G. mammillaris					X		X	X		X																		
Laurencia gemmifera								X																				
L. poitei					X																							
ANGIOSPERMAE																												
Thalassia testudinum					X																			X			X	X

TABLE 4. HOURGLASS ALGAL COLLECTIONS – STATION B

Lat. 27°37'N, Long. 83°07'W: Depth 60' (18.3 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CYANOPHYTA																												
Calothrix confervicola																											X	
Lyngbya bergei		X																										
L. confervoides		X																									X	X
CHLOROPHYTA																												
Avrainvillea levis																							X					
A. longicaulis																					X	X	X	X				
Anadyomene stellata										X																		
Caulerpa mexicana				X																				X	X	X	X	
C. paspaloides	X									X														X			X	
C. peltata																							X					
C. prolifera																							X					
C. prolifera v. *zosterifolia*															X													
C. sertularioides	X			X									X	X	X									X	X	X		
Codium isthmocladum		X	X		X	X	X	X		X		X	X		X			X					X		X	X	X	X
C. i. subsp. *clavatum*	X										X						X						X					
C. repens				X				X		X		X							X	X		X			X			X
Cystodictyon pavonium				X																		X						
Halimeda discoidea	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X		X	X		X	X	X	X
H. opuntia								X									X											
Pseudotetraspora antillarum																										X		
Udotea conglutinata	X	X	X							X	X	X			X							X	X	X	X	X	X	X
U. cyanthiformis																												X
U. flabellum	X	X	X	X	X	X	X	X		X	X	X							X	X			X	X	X	X	X	
Valonia macrophysa																				X								
PHAEOPHYTA																												
Cladosiphon occidentalis																							X					
Colpomenia sinuosa											X											X	X	X				
Dictyopteris delicatula	X																									X		
D. membranacea																								X			X	
Dictyota dichotoma	X										X		X	X	X								X	X		X		X
D. divaricata																									X	X		
Ectocarpus elachistaeformis																											X	
Giffordia sp.																						X						
Rosenvingea intricata																					X	X	X		X			

TABLE 4 (continued)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
R. sanctae-crucis										X	X																	
Sargassum filipendula	X	X	X		X		X			X			F	X				X			F	X	X	X	X	X	X
S. f. v. *montagnei*				X			X	X	X	X	X	X			X			X	X	X							
S. flutans								X																	X			
S. natans		X	X	X								X	X	X	X													
S. sp.													X															
Sporochnus bolleanus										X	X	X		F				X										
S. pedunculatus													X	F								X	X					X
RHODOPHYTA																												
Acrochaetum antillarum																												X
A. flexuosum																			X									
A. thurettii																												X
Agardhiella ramosissima	X												X		X			X							X	CPS	CPS	X
A. tenera	X							X								X		X					X	X	X	X	X	X
Amphiroa rigida v. *antillana*																											X	X
Asterocytis ramosa																			X									
Botryocladia occidentalis	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brongniartella mueronata															X											X		
Callithamnion halliae																						X						X
Ceramium fastigiatum															X											X		X
C. leptozonum														X														
C. rubrum																				X								
Champia parvula														X						X	CPS	X	X	X	X	X	X	X
Chondria floridana																							X	X		X	X	
C. tenuissima																						X						
Chrysymenia enteromorpha		X																					CPS	CPS	X	CPS		
C. ventricosa																												X
Crouania attenuata																				X								X
Dasya collinsiana																												X
D. corymbifera																			÷	X		X	X				X	
D. pedicellata	X																		÷	CPS				X	X			X
D. rigidula																												X
Digenia simplex													X															
Erythrocladia sp.																			X									
Eucheuma acanthocladum	X	X								X	X	X	X	X		X	X					X	X	X	X	X	X	

TABLE 4 (continued)

	1965					1966												1967									
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
Eucheuma isiforme	X		X	X	X	CPS	CPS	CPS	CPS			X	X	X	X	X	X	X	CPS	CPS	X	X		X	X		X	X
Fosliella atlantica																												
Gracilaria armata		X																				X	X		X		X	X
G. blodgettii	X									X	X	CPS	CPS		X	X					CPS			CPS	CPS	X	X		CPS
G. cervicornis	X																X											
G. cylindrica	X															X												
G. debilis				X			X	X	X	X	X	X			X			X	X	X		X	X	X	CPS	X	X	X	X
F. ferox													X									X		X	X	X	CPS	CPS
G. foliifera									X							X		CPS		X	X	X			X		X	
G. f. v. angustissima	X	X		CPS		X				X	X	X	X	X	CPS	X	CPS	X	X			X		X	X	CPS	X	X
G. mammillaris	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	CPS	X	X	X	X	X	X	X	X	X	X	X
G. sjoestedtii													X															
G. verrucosa	X						X				X	X		X	CPS		CPS	X				X	X					
Halymenia agardhii																							X					
H. bermudensis																									X			
H. floresia																								X				
H. gelinaria		X		X			CPS																	X	X	X	X	X
H. pseudofloresia	X	X													X									X	CPS		X	
Jania adherens											X								X					X				
J. capillacea															X										X			
Laurencia gemmifera	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L. intricata	X																											
L. obtusa																										X		
L. poitei		X			X			X	X	X										X	X	X	X		X		X	X
Lithothamnium incertum						X	X			X	X	X							X						X	X		X
L. occidentale						X	X			X	X	X							X						X	X		X
Lomentaria baileyana																			X	CPS					X	X		
Peyssonnelia rubra																								X				
Polysiphonia hapalacantha	X																				CPS							
P. subtilissima														X														
Spyridia filamentosa		X			X						X				X									X	X	X	X	X
Wrightiella blodgettii																					X		X					
Wurdemannia miniata					X								X															X

TABLE 4 (continued)

	1965					1966											1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
ANGIOSPERMAE																												
Halophila baillonis	*X*	*X*				*X*		*X*					*X*		*FL*									*X*	*X*		*X*	*X*
Thalassia testudinum	*X*																										*X*	*X*

TABLE 5. HOURGLASS ALGAL COLLECTIONS – STATION C
Lat. 27° 37′ N. Long. 83° 28′: Depth 120′ (36.6 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CHLOROPHYTA																												
Avrainvillea asarifolia										X																		
A. levis							X																					
A. longicaulis																												
A. nigricans											X																X	
Anadyomene stellata								X																X				X
Bryopsis bypnoides										X																		
B. sp.																												
Caulerpa mexicana							X			X															X			
C. microphysa							X																		X		X	
C. peltata																								X		X	X	
C. p. v. *zosterifolia*												X	X												X			
C. racemosa							X																					
C. sertularioides	X		X	X		X	X	X	X	X		X	X		X	X					X	X	X	X	X	X	X	
C. vickersiae																				X								
Cladophora expansa																				X								
C. howei																							X					
Codium isthmocladum		X	X		X			X	X		X			X				X		X				X	X			
C. i. subsp. *clavatum*				X		X	X			X		X			X	X		X			X						X	X
C. repens																		X										
C. sp.																							X	X	X			
Cystodictyon pavonium			X	X	X	X	X		X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X
Halimeda discoidea						X	X	X	X	X		X				X							X		X			X
H. incrassata																	X											
H. opuntia				X	X	X	X	X	X	X	X				X			X	X	X	X	X	X	X	X	X	X	X
Pseudotetraspora antillarum																											X	
Struvea pulcherrima																											X	
Udotea conglutinata	X		X			X				X	X	X											X	X	X		X	X
PHAEOPHYTA																			F									
Chnoospora minima										X													X	X				
Cladosiphon occidentalis	X									X	X												X	X				
Colpomenia sinuosa															X						X						F	F
Dictyopteris justii				X						X					X						X		X	X			X	
Dictyota dichotoma	X																								X			
D. divaricata																												

TABLE 5 (continued)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
Giffordia conifera										X	F																	
G. sp.																						X	X	X				
Nereia tropica																							X		X			
Padina pavonica												X																
Pocockiella variegata								X																				X
Rosenvingea intricata	X									X	X		X									X	X	X	X			
R. sanctae-crucis												X																
Sargassum filipendula	X		X		X	X						X	X	X						X					X	X	X	X
S. f. v. *montagnei*				X		X	X	X	X	X						X		X	X		X	X	X	X				
S. natans	X	X						X						X	X										X			
S. vulgare										X																		
S. sp.							X																					
Spatoglossum schroederi																		X			X							
Sphacelaria furcigera				X																								
Sporochnus bolleanus										X	X	X			X										X			
S. pedunculatus	X	X									F	X	X	X								X	X	X	F	X	X	X
RHODOPHYTA																												
Agardhiella ramosissima																									X			
A. tenera	X																						CPS	X	X			
Amphiroa rigida v. *antilla*																									X			
Botryocladia occidentalis	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brongniartella mucronata					X																							
Callithamnion halliae											X																	X
Ceramium fastigiatum																											X	
Champia parvula										X											X			X		X		X
Chrysymenia enteromorpha								X			CPS											X	X	X	CPS			
C. ventricosa											CPS																CPS	
Dasya harveyi																								X				
D. pedicellata											CPS	X											X	X			X	
D. rigidula																									X			X
Eucheuma acanthocladum		X								X						X												
E. isiforme	X		X	X	X	CPS	CPS	X	X	X	X	X	X	X	X	X	X	FCPS	CPS	X	X	X	X	X	X	X	X	X
Fauchea hasleri													X															
F. sp.											X											X		X				
Fosliella atlantica																							X				X	X

TABLE 5 (continued)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
Goniolithon mamillare						X					X							X				X			X			X
Gracilaria blodgettii		X									X				X	X							X	X	X	X		
G. cylindrica								X											X								X	CPS
G. debilis															X								X	X			X
G. ferox												X													X		X	X
G. foliifera	X		X						X	X	X			X	X					X	X	X		X	X	X		
G. f. v. *angustissima*	X				X	CPS					X				X	X			X				X		X		X	X
G. mammillaris	X	X		X	X	X	X	X		X			X	X	X	X		X	X		X		X	X	X	X	X	X
G. verrucosa	X									X																		
Halymenia agardhii																									X		X	
H. floresia											X																X	X
H. gelinaria		X	X	X		X																						
H. floridana																												CPS
H. pseudofloresia															X													
Jania adherens											X				X													
Laurencia gemmifera	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
L. obtusa																										X		
L. poitei							X	X	X	X													X	X	X		X	X
Leptofauchea rhodymenioides				X		X																						X
Lithothamnium incertum						X					X							X		X		X			X			X
L. occidentale						X					X							X				X			X			X
Lophosiphonia cristata																											X	
Peyssonnelia rubra																											X	X
Polysiphonia denudata											X																	
P. subtilissima										X																		
Spyridia filamentosa																									X			X
Wrightiella blodgettii									X									X		X	X		X					
W. tumanowiczi										X													X					
ANGIOSPERMAE																												
Halophila baillonis	X														X										X		X	X
Thalassia testudinum																			X								X	X

TABLE 6. HOURGLASS ALGAL COLLECTIONS – STATION D
Lat. 27°37′ N, Long. 83°58′ W: Depth 180′ (54.9 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CYANOPHYTA																												
Dichotrix penicillata												X																X
CHLOROPHYTA																												
Boodleopsis pusilla																												X
Caulerpa microphysa																									X			X
C. prolifera v. *zosterifolia*												X																
C. sertularioides							X					X	X					X				X		X	X	X	X	X
Codium isthmocladum					X	X	X					X												X	X			X
C. i. subsp. *clavatum*			X						X	X						X						X				X	X	
C. sp.																								X		X		
Cystodictyon pavonium						X			X									X			X			X				X
Halimeda discordea																		X										
H. opuntia						X												X						X				X
Struvea pulcherrima												X												X		X		X
Udotea conflutinata																					X							X
PHAEOPHYTA																												
Cladosiphon occidentalis										X														X				
Colpomenia sinuosa																								X				
Dictyopteris justii																												X
Dictyota dichotoma													X													X	X	
D. divaricata																									X			
Giffordia conifera											F																	
G. sp.										X														X		X		
Padina sanctae-crucis																										X		
Pocockiella variegata																												X
Rosenvingea intricata											X											X		X				
Sargassum filipendula	X				X				X	X	X													X		X	X	X
S. f. v. *montagnei*				X		X		X		X		X							X		X							
S. fluitans			X																			X				X		
S. natans	X	X					X				X	X		X		X	X	X								X		
S. vulgare										X																		
S. p.							X											X										
Sporochnus bolleanus										X	X													X				
S. pedunculatus		X									X	X	X	X												X	X	
RHODOPHYTA																												

TABLE 6 (continued)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
Agardhiella tenera																									X			
Botryocladia occidentalis	X	X				X	X	X	X									X	X					X		X	X	X
Chrysymenia enteromorpha																								X				
Dasya harveyi																								X				
D. pedicellata	X									X														X				X
Eucheuma acanthocladum										X						X												
E. isiforme						CPS	CPS	X		X	X					X	X	X	CPS		X			X			X	
Fosliella atlantica												X															X	X
Gracilaria blodgettii																												
G. cylindrica																												X
G. debilis																												X
G. ferox																												X
G. foliifera					X					X	X		X						X		X			X		X		
G. f. v. *angustissima*														X		X						X			X	X		X
G. mammillaris	X	X	X	X	X	X	X	X	X	X			X			CPS		X			X			X	X	X	X	X
G. verrucosa										X	X																	
Halymenia agardhii																										X		
H. bermudensis																					X			⊕		X		
H. floridana																								X				X
H. pseudofloresia																												
H. sp.																										X		
Jania adherens																										X		X
Laurencia gemmifera						X	X	X	X	X		X				X		X			X	X		X		X	X	X
L. obtusa		X									X															X		
L. poitei							X																	X			X	X
Leptofauchea rhodymenioides																												
Lithothamnium incertum																												X
L. occidentale										X											CPS			X				X
Polysiphonia denudata																												
Spyridia filamentosa																												X
Wrightiella blodgettii										X																		
W. tumanowiczi																												
ANGIOSPERMAE																												
Halophila baillonis	X	X																										X
Thalassia testudinum																											X	X

TABLE 7. HOURGLASS ALGAL COLLECTIONS–STATION E

Lat. 27°37′N. Long. 84°13′W: Depth 240′ (73.2 meters)

	1965					1966											1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CYANOPHYTA																												
Dichothrix penicillata																												X
CHLOROPHYTA																												
Caulerpa sertularioides						X						X												X	X			X
Codium isthmocladum						X			X																		X	
Cystodictyon payonium						X																						
Halimeda opuntia																		X										
Struvea pulcherrima																												X
Udotea conglutinata						X																						
PHAEOPHYTA																												
Dictyota dichotoma																											X	
Giffordia conifera											F																	
Sargassum filipendula					X		X		X				X			X		X						X				X
S. f. v. *montagnei*			X	X		X		X																				
S. fluitans												X	X															X
S. natans	X	X						X			X	X		X									X	X		X	X	
Sporochnus bolleanus											X							X										
S. pedunculatus												X		X									X					
RHODOPHYTA																												
Botryocladia occidentalis					X	X								X				X									X	X
Eucheuma isiforme						CPS										X	X	X										
Fosliella atlantica																											X	
Gracilaria cylindrica																											X	
C. foliifera																		X							X			
G. f. v. *angustissima*						X						X	X															
G. mammillaris		X		X	X	X	X		X				X	X			X											X
Halymenia bermudensis																									X			
H. floridana																									CPS			
H. sp.																											X	
Laurencia gemmifera					X	X	X	X	X									X										X
Lithothamnium incertum																		X										
L. occidentale																		X										
Spyridia filamentosa																												X
ANGIOSPERMAE																												
Halophila baillonis																									X			
Thalassia testudinum																											X	X

TABLE 8. HOURGLASS ALGAL COLLECTIONS–STATION I
Lat. 26°24′N, Long. 82°06′W: Depth 20′ (6.1 meters)

	1965					1966											1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
PHAEOPHYTA																												
Sargassum filipendula													X														X	X
S. f. v. *montagnei*								X																				
Sporochnus pedunculatus													X														X	
RHODOPHYTA																												
Gracilaria foliifera v. *angustissima*				X																								
G. mammillaris	X																											
Halymenia bermudensis																												CPS
Laurencia poitei													X															
ANGIOSPERMAE																												
Syringodium filiforme			X																									
Thalassia testudinum																											X	

TABLE 9. HOURGLASS ALGAL COLLECTIONS - STATION J

Lat. 26°24′N, Long. 82°28′W: Depth 60′ (18.3 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CYANOPHYTA																												
Lyngbia gracilis																							X					
CHLOROPHYTA																												
Caulerpa ashmeadii																									X	X		
C. mexicana		X																								X	X	
C. prolifera v. *zosterifolia*																						X						
C. sertularioides		X													X										X	X		
Codium isthmocladum																								X		X		
C. i. subsp. *clavatum*													X														X	X
Cystodictyon pavonium																									X			
Halimeda discoidea							X		X		X														X			
H. opuntia											X																	
Udotea conglutinata	X	X																						X				
PHAEOPHYTA																												
Dictyota dichotoma											X		X	X										X				
D. divaricata																									X			
Giffordia rallsiae																							X					
G. sp.																						X						
Rosenvingea intricata										X											X	X	X					
Sargassum filipendula	X	X			X	X	X	X		X							X	X	X		X	X		X	X	X	X	X
S. f. v. *montagnei*				X					X		X	X											X					
S. natans		X														X												
S. sp.													X															
Sporochnus pedunculatus													X		X									X				
RHODOPHYTA																												
Agardhiella ramosissima																								X	X	X		
A. tenera	X																	X					X	X	X		CPS	CPS
Botryocladia occidentalis		X					X			X	X	X	X	X		X			X			X		X			X	X
Brongniartella mucronata											X																	
Champia parvula													X								X		X		X			
Chondria atropurpurea											X																	
C. sedifolia																								⊕				
C. tenuissima																									X			
Chrysymenia enteromorpha	X																							X				
Crouania attenuata																						X						

TABLE 9 (continued)

	1965					1966												1967									
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
Dasya corumbifera										X																		
D. pedicellata																						⊕						
D. rigidula																									X			
Eucheuma acanthocladum		X					X	X			X	X	X		X									X	X	X		X
E. isiforme	X	X	X	X	X	X				X				X		X		X						X	X		X	X
Fosliella atlantica																								X				
Goniolithon mamillare												X																X
Gracilaria armata																												
G. blodgettii		CPS								X	CPS											X	CPS	CPS	CPS	CPS		
G. cervicornis																								X				
G. cylindrica		X																										
G. damaecornis													X															
G. debilis				X		X	X	X	X	X	X	X	CPS	X	X				X		X	X		X	X			CPS
G. ferox	X																				X			X	X	X	X	
G. foliifera	X			X																					X			
G. f. v. angustissima		CPS					X						X	X	X	X	X	X						X	X		X	
G. mammillaris						X	X	X	X	X	X	X	X	X										X	X		X	
G. sjoestedtii				X																				X	X		X	X
G. verrucosa	X	X	X					CPS		X	X			X	X									X				
Halymenia agardhii																								X				
H. floresia	X										X	X												X	X	X	X	
H. pseudofloresia																									X			
Hypnea cervicornis																								X				
Jania adherens																									X			
Laurencia gemmifera				X	X	X	X		X			X	X			X								X	X	X	X	X
L. intricata	X																								X			
L. poitei		X	X					X			X						X				X	X		X	X	X	X	
Lithothamnium incertum																					X							X
L. occidentale																												X
Polysiphonia subtilissima																						X						
Spyridia filamentosa	X	X											X											X	X	X		
Wurdemannia miniata											X														X			
ANGIOSPERMAE																												
Halophila baillonis	X	X									X		X	X	X									X	FL	FL		
Thalassia testudinum																							X				X	

TABLE 10: HOURGLASS ALGAL COLLECTIONS – STATION K
Lat. 26°24′N, Long. 82°58′W: Depth 120′ (36.6 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CYANOPHYTA																												
Dichothrix penicillata													X															
CHLOROPHYTA																												
Caulerpa ashmeadii																									X			
C. cupressoides																								X				
C. mexicana														X											X			X
C. microphysa																										X		
C. prolifera v. *zosterifolia*																								X				
C. sertularioides	X	X	X	X									X	X	X						X		X			X	X	
Codium isthmocladum		X												X														
C. i. subsp. *clavatum*													X		X								X	X	X	X	X	
C. sp.													X										X					
Cystodictyon pavonium																							X	X	X			
Enteromorpha clathrata																					X							
E. plumosa																						X						
Halimeda discoidea							X		X	X													X					
H. incrassata		X																										
H. opuntia			X	X	X	X	X		X	X		X		X	X						X	X	X	X	X	X	X	X	X
Struvea pulcherrima																									X			
Udotea conglutinata				X						X	X	X											X	X		X		
PHAEOPHYTA																												
Cladosiphon occidentalis											X										X	X	X					
Colpomenia sinuosa	X	X																					X					
Dictyopteris delicatula																									X			
D. justii																									F			
Dictyota dichotoma													X	X										X	X	X		
Nereia tropica														X								X	X					
Pocockiella variegata				X																								
Rosenvingea intricata											X	X	X									X	X					
Sargassum filipendula	X	X				X				X		X		X					X					X		X		
S. f. v. *montagnei*			X					X	X		X										X	X	X				X	X
S. fluitans											X																	
S. natans		X	X										X		X								X	X	X	X	X	
S. sp.							X																					X

TABLE 10 (continued)

	1965					1966											1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
Sporochnus bolleanus	X												X															
S. pedunculatus	X	X									X	X	X	X	X							X	X	X	X	X		
RHODOPHYTA																												
Agardhiella ramosissima																									X			X
A. tenera																							X	X		X	CPS	
Botryocladia occidentalis			X																					X			X	X
Champia parvula																										X		
Chondria baileyana																							X					
C. floridana																										X		
Chrysymenia enteromorpha	X											X	X									X	X	X				
Dasya corymbifera																							X					
D. harveyi																							X					
D. pedicellata						X						X										X		⊕CPS	X			
D. rigidula																										X		
Eucheuma isiforme			X																CPS								X	X
Fosliella atlantica																											X	X
Goniolithon mamillare						X					X			X										X			X	
Gracilaria blodgettii	CPS												CPS	CPS									X		CPS	X		X
G. cervicornis																									X			
G. cylindrica		X													X													
G. debilis																					X						X	X
G. ferox																											X	X
G. foliifera		X																						X	X	X		
G. f. v. angustissima															X							X		X				X
G. mammillaris									X		X	X	X	X	X										X	X	CPS	X
G. verrucosa															CPS													
Griffithsia barbata																						X						
Halymenia agardhii																					X⊕							
H. floresia																											X	
H. pseudofloresia																							X					
Helminthocladia calvadosii																						X						
Laurencia gemmifera						X			X		X		X										X		X		X	X
L. intricata																						X						
L. obtusa																										X		

TABLE 10 (continued)

	1965					1966											1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
L. poitei	X	X				X		X						X							X					X		
Lithothamnium incertum						X					X			X										X			X	
L. occidentale						X					X			X										X			X	
Lomentaria baileyana																						X						
Polysiphonia subtilissima																						X	X					
Spyridia filamentosa																							X		X	X		
Wrightiella blodgettii													X									X	X	CPS	X	X		
W. tumanowiczi																										X		
ANGIOSPERMAE																												
Halophila baillonis	X												X													X		
Thalassia testudinum																							X				X	X

TABLE 11. HOURGLASS ALGAL COLLECTIONS – STATION L
Lat. 26°24′N, Long. 83°22′W: Depth 180′ (54.9 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CHLOROPHYTA																												
Caulerpa prolifera v. *zosterifolia*																										X		
C. sertularioides				X							X			X	X	X	X						X		X	X	X	X
Cladophora delicatula														X														
Codium isthmocladum															X													X
C. i. subsp. *clavatum*																							X	X	X	X		
C. sp.													X	X														
Cystodictyon pavonium													X															
Halimeda discoidea															X	X	X						X	X	X		X	
H. opuntia															X	X							X	X	X		X	
Struvea pulcherrima															X						X			X	X	X		
Udotea conglutinata										X																		
PHAEOPHYTA																												
Dictyopteris justii																									X			
Dictyota dichotoma														X	X	X	X							X	X		X	
D. divaricata																										X		
Nereia tropica														X									X		X			
Padina pavonica																												X
P. sanctae-crucis																								X	X	X		
Pocockiella variegata																												X
Rosenvingea intricata																							X					
Sargassum filipendula										X		X		X											X	X	X	X
S. fluitans												X																
S. natans		X										X	X	X										X	X	X		
S. sp.									X																			
Sporochnus bolleanus										X	X		X	X	X										X			
S. pedunculatus												X	X											X	X	X	X	
RHODOPHYTA																												
Agardhiella tenera																												X
Botryocladia occidentalis														X	X										X			
Dasya pedicellata																							⊕CPS					
Digenia simplex																							X					
Fauchea hassleri																									⊕			
F. sp.																								X				

TABLE 11 (continued)

	1965					1966											1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
Fosliella atlantica																											X	
Goniolithon mamillare					X	X		X	X		X						X										
Gracilaria blodgettii											X			X											X	X	X	
G. cylindrica																									X			
G. foliifera														X	X													
G. f. v. *angustissima*																								X				
G. mammillaris				X		X			X		X	X	X				X							X	X	X	X	X
G. verrucosa																											X	
Halymenia agardhii																									X			
H. bermudensis																											X	
H. floresia																											X	
H. floridana																										X		
Laurencia gemmifera																								X			X	
Lithothamnium floridanum																										X		
L. incertum					X	X		X	X		X						X									X		
L. occidentale					X	X		X	X		X						X									X		
Peyssonnelia rubra													X															
ANGIOSPERMAE																												
Thalassia testudinum																											X	X

TABLE 12. HOURGLASS ALGAL COLLECTIONS – STATION M
Lat. 26°24′N, Long. 83°43′W: Depth 240′ (73.2 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CHLOROPHYTA																												
Anadyomene stellata			X																									
Caulerpa sertularioides																												
Codium isthmocladum																						X	X			X		
C. i. subsp. *clavatum*																									X			
Halimeda opuntia																										X		
Struvea pulcherrima											X												X	X		X	X
PHAEOPHYTA																									X			
Colpomenia sinuosa		X																					X					
Dictyopteris justii																									X			
D. membranacea																									X			
Dictyota dichotoma																							X	X	X	X		
Dictyotaceous sp.														X											X			
Hypoglossum tenuifolium																									X			
Padina sanctae-crucis																									X			
Pocockiella variegata					X																				X			
Rosenvingea intricata											X												X					
Sargassum filipendula				X						X														X				
S. f. v. *montagnei*			X						X																X			
S. natans												X	X														X	
Spatoglossum schroederi																									X	X	X	X
Sporochnus bolleanus														X												X		
S. pedunculatus												X		X												X		
RHODOPHYTA																								X		X		
Agardhiella tenera																												
Chrysymenia enteromorpha													X												X			
C. halymenioides																												
Dasya crouaniana																								X				
D. pedicellata																										X		
Fauchea hassleri																										X		
F. peltata																										X		
Fosliella atlantica																										CPS		
Goniolithon strictum							X																				X	
Gracilaria blodgettii											X		X									X						

TABLE 12 (continued)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
G. cuneata																										CPS		
G. cylindrica																									X			
G. foliifera																								X				
G. f. v. *angustissima*														X											X			
G. mammillaris		X			X	X	X	X	X	X	X	X	X	X										X	X	X	X	X
Halymenia bermudensis																								X		X		X
H. floresia																											X	
H. gelinaria							X																					
H. floridana																										CPS		
H. pseudofloresia																								CPS				
H. sp.														X										X	X	X		
Laurencia gemmifera							X																				X	
L. poitei							X																					
Leptofauchea brasiliensis																										X		
Lithothamnium incertum					X	X	X																X					
L. occidentale					X	X	X																X					
L. sp.																										X		
Peyssonnelia rubra																										X	X	
Rhodophyllis gracilarioides																								X				
Wrightiella blodgettii													X															
ANGIOSPERMAE																												
Halophila baillonis																										X	X	
Thalassia testudinum						X																					X	X

TABLE 13. HOURGLASS ALGAL COLLECTIONS STATION N
Lat. 27° 03′N, Long 83° 14′W: Depth 128′ (39.0 meters)

	1965					1966												1967										
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
CHLOROPHYTA																												
Udotea conglutinata											X																	
PHAEOPHYTA																												
Sargassum sp.											X																	

Legends for plates

PLATE I

Figure 1. *E. acanthocladum* (C. Agardh) J. Agardh. Example of a heavily branched specimen showing occasional spines. This could be a form of *E. isiforme.* X 0.69

Figure 2. *E. isiforme* (C. Agardh) J. Agardh. A typical, thickly spined specimen. X 0.58

PLATE I

PLATE II

Figure 3. *Cystodictyon pavonium* J. Agardh. A view of typical fragments collected by dredge and trynet in the deeper water stations. X 0.51

Figure 4. *C. pavonium* J. Agardh. A microscopic close-up of filament branching. X 84.3

Figure 5. *Struvea pulcherrima* (J. A. Gray) Murray and Boodle. General view of an entire specimen. Arrow notes holdfast. X 1.09

PLATE II

PLATE III

Figure 6. *Caulerpa vickersiae* Børgesen. A composite micrograph demonstrating the rhizome, rhizoids, and irregular pinnules of this small species. X 30

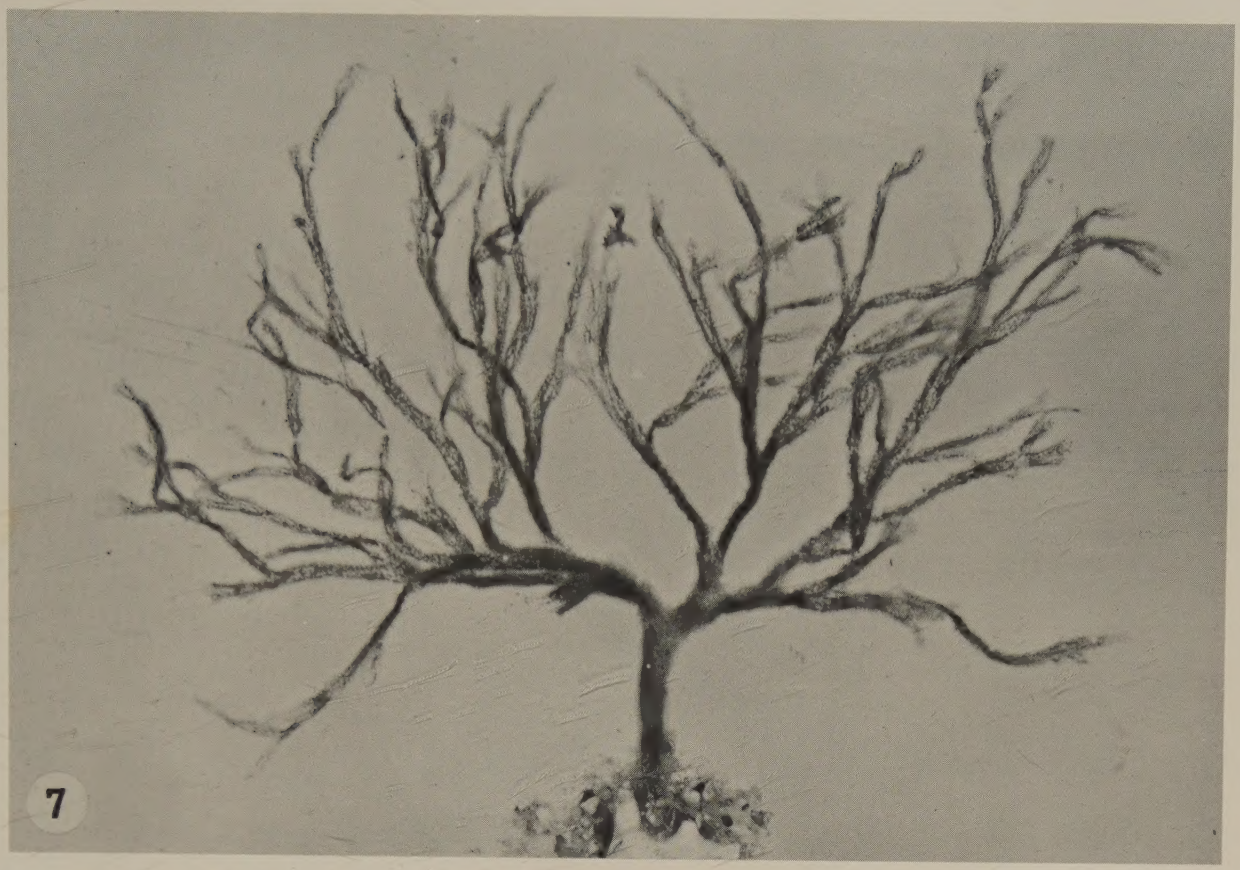
PLATE III

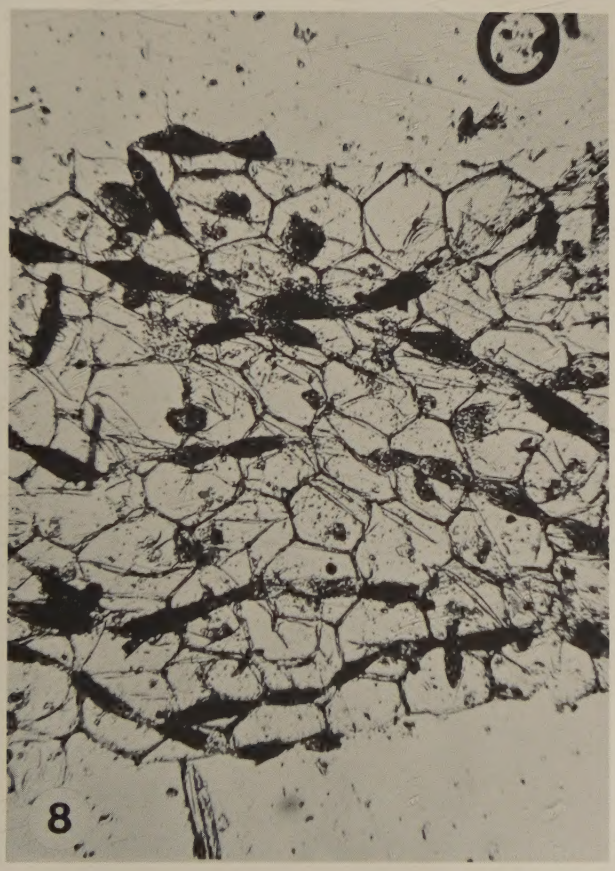
PLATE IV

Figure 7. A general view of an unidentified *Codium*-like plant collected at deeper stations. X 2.4

Figure 8. A view of the stalk cortex which consists of flattened utricles which are firmly fused together. X 76.5

Figure 9. A close-up of a utricle showing the constricted filament connecting it to the central siphon. X 396





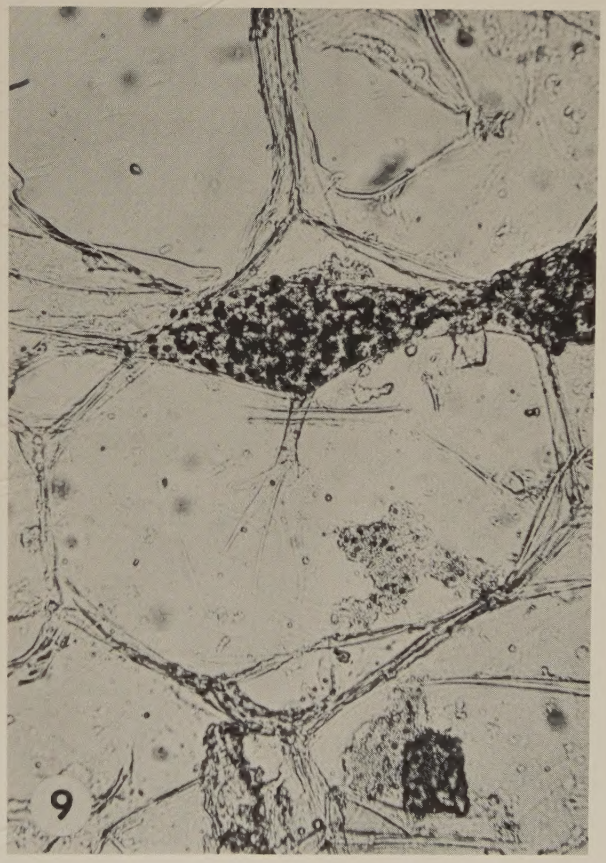


PLATE IV

PLATE V

Figure 10. *Codium isthmocladum* Vickers subspec. *clavatum* (Collins and Hervey) Silva. A general view of a young plant which was common in dredge hauls from most stations. X 1.04

Figure 11. Same. A microscopic view of the utricles, freely separating. X 65.5

Figure 12. Same. A close-up of the peripheral utricles showing the thin outer wall. X 196.5

PLATE V